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out of its old skin, the worm makes a careful review of the operation, with its head feeling the aperture of every spiracle, as well as the tail, probably for the purpose of removing any broken fragment of skin which might have remained in these delicate organs. Not only is the outer skin cast off, but also the lining of the air tubes and intestines, together with all the chewing organs and other appendages of the head. After the moulting, the size of the larva is considerably increased, the head is large compared with the body, but eight or ten days later it will look small, as the body will have increased very much in size. This is a certain indication that the worm is about to moult. Every ten days the same operation is repeated; from the fourth moulting to the time of beginning the cocoon, the period is about sixteen days.

The worms seem entirely unable to discern objects with their simple eyes, but they can distinguish light from darkness, as a very simple experiment will show. If a worm be put in a box with two holes in it, one of them turned to the light, the other to the dark, the caterpillar will very soon come out through the hole turned to the light.—*To be continued.*

WINTER NOTES OF AN ORNITHOLOGIST.

BY J. A. ALLEN.

The winter birds of the northern and eastern States are few in number. In Massachusetts, away from the sea shore, there are ordinarily but fifty-five to sixty species, which consist mainly of permanent residents and winter visitors from more northern districts. The resident

kinds are either rapacious birds, or such hardy species as Titmice, Jays, Woodpeckers, Nuthatches, Finches and Grouse, whose means of subsistence is about equally sure at all seasons. A few are, more properly, migrant summer species, of which only hardy adventurous individuals linger with us in winter, the majority seeking a milder home farther south: among such are the Meadow Lark, Kingfisher, Cedar Bird and Robin. The winter visitors are all from the north; many of these are irregular in their visits, coming to us only when driven southward by the severity of the weather, or more probably by scarcity of food. Of this whole number the limits of our paper will allow us to notice but a few, and even of the more interesting to give but very brief accounts.

The rapacious or raptorial birds, the Hawks and Owls, though comparatively numerous in species, are not so in individuals. Shy and mistrustful, seeking the retirement of the wilderness or the forest, and the nocturnal kinds active only by night, they form but an inconspicuous feature in our local ornithology. Constantly persecuted by man, they have decreased greatly in numbers since the first settlement of our country, and every year they seem more and more to avoid the cultivated districts, seeking a more congenial home in the less inhabited parts of the continent.

Of the true or typical Falcons, esteemed the "noble" birds of prey in the old days of falconry, we have in winter, as at other seasons, now and then a Duck Hawk or Peregrine Falcon (*Falco anatum* Bon.), a Pigeon Hawk (*Hypotriorchis columbarius* Gray), and a Sparrow Hawk (*Tinnunculus sparverius* Vieill.), but so rare are they that a careful observer will ordinarily see but one or two of each in a winter, or perhaps oftener none at all. The

first of these, the dreaded Duck Hawk, is frequent along the sea border and large open rivers where abound the aquatic birds that form his chief prey. The celebrated White Hawk or Jer-Falcon (*Falco candicans* Gm.) is larger and more powerful even than the Peregrine, but it comes to us so rarely from its remote arctic home, as to be justly considered but an accidental wanderer.

Of the hawks, properly so called : namely, the short winged and "ignoble" birds of prey, the majority are migratory in the more northern sections of the Union, going south in winter. One, however, the Gos-Hawk (*Astur atricapillus* Bon.) is a winter visitor, and subsisting upon rabbits, partridges, jays, and such other birds and poultry as fall in his way, is a bird of considerable celebrity for his strength and boldness. Formerly his European ally of the same name, and with which the earlier ornithologists supposed ours to be identical, was held in great esteem in hawking, and according to Pennant, was considered of unequalled value among the short winged hawks for the purposes of falconry. It is, moreover, when mature, of beautiful plumage, the white under surface being elegantly pencilled transversely with waved ashy-brown lines, and with broader longitudinal stripes of a dark ferruginous hue. The young are more plainly colored, and differ for several years so widely from their parents, as to be hardly recognizable as belonging to the same species. I once found a wing of this bird, which had been dropped in the woods by some bird of prey ; the flesh had been torn from it, leaving only the bones of the upper and fore arm, and the primary quills, showing that even such tyrants of the air are not exempt from enemies more powerful even than they. Possibly it was the Duck Hawk that in this case was the destroyer, since its representa-

tive in Europe, the Peregrine, is known to have a particular relish for the flesh of other hawks, and to hunt the poor Kestrel as its most dainty game.

The well known "Red-tail," (*Buteo borealis* Gm.) from his retreat in the forest, sometimes makes sudden forays on the poultry. Several kinds of large and sluggish hawks silently await in the open meadows the appearance of their minute but favorite game, the field mice, and the Marsh Harrier (*Circus Hudsonius* Vieill.) anon skims rapidly over the snowy fields in eager quest of food. But the most beautiful, when in mature plumage, as well as the largest of our winter birds of prey, is the historical White-headed, or Bald Eagle (*Haliaetus leucocephalus* Savig.), most inappropriately chosen for our national emblem. The Golden Eagle (*Aquila Canadensis* Cass.), a far nobler bird, is perhaps almost too uncertain a visitor to warrant enumeration in our list.

The Strigidae, or Owls, the "mysterious birds of night" are even less common than the preceding group, though in winter the number of species is increased by migrants from the north. The resident kinds of most frequent occurrence are the Mottled Owl, (*Scops asio* Bon.) perhaps better known as the "Screech Owl", the Great Horned or Cat Owl (*Bubo Virginianus* Bon.), the Barred Owl (*Syrnium nebulosum* Gray), the Short-eared Owl (*Brachyotus Cassinii* Brew.), and the Long-eared Owl (*Otus Wilsonianus* Less.) Of the migratory species the most common and best known is the Snowy Owl (*Nyctea nivea* Gray) which visiting us, at times, in considerable numbers, at once attracts attention from its large size and white plumage. Very rarely the Great Grey or Cinereous Owl (*Syrnium cinereum* Aud.), one of the largest and most handsome of the American Owls, pays us a visit

from his home in the Canadas and sub-arctic regions. In northern New England the semi-diurnal Hawk Owl (*Syrnia ulula* Bon.) is comparatively common, and lurking near the hunter profits by the pieces of game which he throws away, or now and then captures wounded birds.

Excepting the cruel, selfish and solitary raptorial species, our winter birds mostly associate in groups, not of individuals of a single kind merely, but of species, drawn together chiefly perhaps from similarity of food, and probably also from real love of each other's society. The winter representatives of these birds are of larger size, and of brighter colors than those seen in summer.

In the savage Butcher Bird or Northern Shrike (*Collyrio borealis* Baird), which seems but a hawk in miniature, we have, nevertheless, an exception to the gregarious tendency generally observed in winter among our smaller birds. He is one of our regular, but not very numerous visitors during the colder parts of the year, though less common than in the fall and spring; when those that winter farther south pass us in their migrations. It is, however, bolder, recklessly pouncing on birds in cages exposed near open windows. The song of a Canary will often retain him in the vicinity for a long time, waiting, restless and impatient from hunger, for an opportunity to make it his victim. In the woods he is continually quarrelling with the Jays, which both fear and hate him, and I have seen him in hot pursuit of a Chickadee, which was trembling with fright.

In winter all our birds seem to possess an unusual interest, perhaps no less from their scarcity than from the cheeriness their presence seems to lend. None, however, are dearer to me than the little woodland group of Titmice, the Nuthatches, the Creepers, the diminutive King-

lets, and the spotted Woodpeckers we so frequently meet in our forest walks.

Although the smallest of all our birds, except the Humming Bird, the Gold-crested Kinglet (*Regulus satrapa* Licht.) is one of the most hardy of our winter visitors, and is the more interesting from his exceeding diminutiveness. With a body hardly larger than a hickory nut, it is so thickly clothed with downy plumage that on a cold morning, when every delicate feather is fully expanded he looks like a ball of animated down, and thus clad, he is able to defy old Boreas.

Our winter field birds, like the field birds of summer, are chiefly members of the numerous Sparrow and Finch family, or Fringillidæ. Among them the beautiful Snow Bunting (*Plectrophanes nivalis* Meyer) is one of the largest, and when whirling from field to field in compact flocks, their white wings glistening in the sunlight, form one of the most attractive sights of winter; and most commonly appearing about the time of heavy falls of snow, and disappearing during continued fine weather, there is in the popular mind a degree of mystery attached to their history, being the "Bad weather Birds" of the superstitious. Cold half-arctic countries being their chosen home, they only favor us with their presence during those short intervals when their food in the northern fields is too deeply buried; and being strong of wing and exceedingly rapid in flight, they can in a few hours leave the plain for the mountain, or migrate hundreds of miles to the northward. The most common and frequently seen however, is the Yellow Bird (*Chrysomitris tristis* Bon.), but so changed in appearance in his plain winter suit of drab, that he is scarcely recognised as the beautiful Goldfinch we so much admired in summer. Feeding on the

abundant supply of nutritious seeds furnished by the weeds that rise above the snow, as well as on the seeds of the hemlock, the spruce, the larch, the alder and birch of the swamps and thickets, he never lacks for food, even in the severest weather; roving in flocks, social and joyful, he seems the very ideal of contentment. One of his more common associates is the Pine Finch, or Northern Siskin, (*C. pinus* Bon.); though rather more partial to the forests than he, they greatly resemble each other in their notes and general habits; but the latter, from its more pointed wings and slender form, is swiftest in flight, and possesses milder and more wiry notes, often heard while its author is far beyond our sight.

Some of the members of this large family, such as the two species of Crossbills, depend so much for food on the coniferous forests as to be seldom seen far away from their borders. The Common or Red Crossbill (*Curvirostra Americana* Wilson), though partially resident, is of desultory habits, and is never commonly seen, except when the pine woods, their usual home, are well laden with cones. The White-winged (*C. leucoptera* Wilson), its smaller but more beautiful congener, and an inhabitant of the northern forests of the Old World as well as of America, we only see at irregular intervals, commonly years apart. The winter of 1859-60 is memorable with bird collectors for their great abundance in our spruce and larch swamps, as well as for the occurrence of a very unusual number of other northern strangers. The Crossbills, by the great strength of their maxillary muscles, and their strong oppositely curved mandibles, are able to pry open the tightly appressed scales of the fir cones, and to extract at pleasure the oily seeds, which other birds equally fond of have to wait for the elements

to release. The Pine Grosbeak, or the Bulfinch of the North (*Pinicola Canadensis* Cab.), is another species more or less dependent on the forests, the Virginia Juniper affording him favorite food. His home, too, is the mountains and uninhabited northern timber lands. They visit us but occasionally, and then in such small parties, locally distributed, as to escape general observation.

Among our more familiar resident birds, there are but few species that seem as numerous in winter as at other seasons; of these the Blue Jay (*Cyanura cristata* Swains.) is a prominent example. Though unusually social in his disposition, he is yet hardly gregarious. The noisy screams of small scattered parties reach us from the swamps and thickets almost daily, and in the severer weather individuals make frequent excursions to the orchard and farmers' cribs of corn, the few grains they pilfer being amply paid for in the destruction of thousands of the eggs of the noxious tent-caterpillar. The poor Crow (*Corvus Americanus* Aud.), despised or persecuted by nearly all, is a bird of unusual interest to every lover of nature, and is a true friend to the farmer, though he finds in the latter a most inveterate enemy. The few Crows that remain with us during the long cold winter, seem able to support but a miserable existence; but no sooner does returning spring and the bare earth afford them a supply of grubs and other noxious insect larvæ, than they fare liberally, and their labors thus contribute vastly to the welfare of the farmer. Capable of withstanding the deforesting of the country, which has exterminated so many of our larger birds, he needs but little encouragement to become one of our most familiar and useful birds.

Passing by numerous species of our winter birds, including the rasorial kinds, or the Grouse and their allies,

and others of equal interest with those already mentioned, we have but space to notice very briefly some of our winter water-fowl. Those found at this season inland or remote from the sea, are so exceedingly few as scarcely to attract attention. They are confined exclusively to the tribes of Ducks and Grebes. The Whistle-wing or Golden-eyed Duck (*Bucephala Americana* Baird), the Goosander or Sheldrake (*Mergus Americanus* Cass.) and the Hooded Merganser (*Lophodytes cucullatus* Reich.), are occasionally seen on the rivers about open water, being much more common at the beginning of the season or towards spring, than in mid-winter. Along our coast, however, are found numerous representatives, many of which are visitors from more northern regions, and nearly all of which are of rare or of unknown occurrence very far inland. These by their numbers serve most agreeably to enliven our bleak coast. Such are the Gannets and Shearwaters, Jager Gulls and Terns, with the Eider Duck, Puffin, Auks and Guillemots.

The number of common species of winter birds is less than *one-tenth* the number of the common species in other seasons; while the difference in the total number of individuals is even much greater, a scarcity of birds being eminently, in our latitude, one of the characteristics of the season of winter.

In reviewing carefully a complete list of our Winter Birds, we are forcibly struck with the small proportion of species that can be considered as regularly common. Thus, out of nearly sixty species of inland birds that are known to inhabit southern New England in winter, we find but fourteen that we can hope to meet with at all frequently; the remaining seventy-six per cent. falling into the class of rare, though regularly occurring, migrants

and residents, or into the list of irregular and occasional visitors. The proportion of rare species to common ones, of irregular visitors to the regular, is perhaps well exhibited by the subjoined tabular *résumé*:

Species common	.	.	.	.	.	.	.	.	14
“ rare	.	.	.	.	.	.	.	.	45
“ resident	.	.	.	.	.	.	.	.	26
“ migrant	.	.	.	.	.	.	.	.	33
“ irregular in their visits (and occurring in winter only).	.	.	.	.	.	.	.	.	7
“ of summer that linger occasionally in winter	.	.	.	.	.	.	.	.	4
Total of Winter Birds	.	.	.	.	.	.	.	.	59

The following table further shows what families are represented, and the number of species of each, as well as the number resident and migrant, rare and common.

	Common.	Rare.	Resident.	Migrant.
1. Falconidæ (<i>Hawks</i>)	0	9	5	4
2. Strigidæ (<i>Owls</i>)	0	9	6	3
3. Picidæ (<i>Woodpeckers</i>)	2	1	2	1
4. Alcedinidæ (<i>Kingfishers</i>)	0	1	0	1
5. Turdidæ (<i>Thrushes, etc.</i> ,)	0	2	0	2
6. Bombycilidæ (<i>Waxwings</i>)	0	2	1	1
7. Laniadæ (<i>Shrikes</i>)	0	1	0	1
8. Liotrichidæ (<i>Wrens, etc.</i>)	0	1	0	1
9. Certhiadæ (<i>Creepers</i>)	1	0	1	0
10. Sittidæ (<i>Nuthatches</i>)	1	1	1	1
11. Paridæ (<i>Titmice</i>)	1	0	1	0
12. Fringillidæ (<i>Finches, etc.</i>)	2	8	1	9
13. Icteridæ (<i>Troupials</i>)	0	1	0	1
14. Corvidæ (<i>Crows and Jays</i>)	2	0	2	0
15. Tetraonidæ (<i>Grouse</i>)	1	0	1	0
16. Perdicidæ (<i>Quails</i>)	1	0	1	0
17. Anatidæ (<i>Ducks</i>)	2	5	3	4
18. Colymbidæ (<i>Divers</i>)	1	4	1	4
	<hr/> 14	<hr/> 45	<hr/> 26	<hr/> 33

The whole number of families represented, as may be seen from the above exhibit, is eighteen; only five (Falconidæ, Strigidæ, Fringillidæ, Anatidæ, Colymbidæ) have each more than three species, and excepting those of one family (Fringillidæ), are all to be reckoned among the rarer kinds. The Fringillidæ, or Finch family, has the greatest number, and probably in individuals outnumbers all the others together; it has, however, but a single resi-

dent species (the Yellow Bird), and only two (the Yellow Bird and Tree Sparrow), that can be counted as regularly common in winter. The two families of raptorial birds have each five or six resident species, but of the total of nine species furnished by each, all, as already observed, are rather rare species.

REVIEWS.

ON THE *LYSIANASSA MAGELLANICA*, AND ON THE CRUSTACEA OF THE SUBORDER AMPHIPODA AND SUBFAMILY *LYSIANASSINA* FOUND ON THE COAST OF SWEDEN AND NORWAY. By Prof. William Lilljeborg. pp. 38, with 5 plates. *Upsala*, 1865. 4to.

In this well illustrated paper, which is written in our own language, we are introduced to a very remarkable exception to the usual law of the distribution of animals. A species, one of the most gigantic of its group, being three inches in length, which was first discovered near Cape Horn, by D'Orbigny, reappears, upon the authority of Prof. Fries, near Spitzbergen, "on the bank by Beering Island." The specimens from the two localities were not actually compared, but a drawing and description of the *Lysianassa Magellanica*, from Spitzbergen, were found to agree perfectly with Milne Edwards' type-specimen collected by D'Orbigny. Sceptics may require the specimens to be placed side by side, before accepting the conclusions of even such eminent authorities as those named above. Other species of animals are said to be common to both poles. Three species of shells, "*Saxicava arctica*, *Venus pullastra*, and *Pecten pusio*," and a Crustacean, are said by the author to be "found both on our northern coasts, and at the Cape of Good Hope, though not in the intermediate tropical regions." The author enumerates several *genera* of inter polar shells, and also quotes as follows from Prof. Fries regarding the plants of these regions:

Hooker enumerates *Erigeron alpinus*, *Carex festiva*, *Phleum alpinum* and *Trisetum subspicatum*, but it is probable that on closer examination these will be found to be nearly related, but different species. A remarkable example of a species common to both the Arctic and Antarctic regions, and not met with elsewhere, is afforded by the beautiful and easily distinguished species of moss, *Usnea melaxantha*, which is met with in Greenland and Spitzbergen, as well as in New Zealand and the most southerly portions in America. The only difference between the northern and southern forms is, that the latter seems